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COMPLIANT



User's Guide



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CN3440 SERIES Universal Temperature & Process Controllers

Installation Guide

WARRANTY/DISCLAIMER

OMEGA ENGINEERING, INC. warrants this unit to be free of defects in materials and workmanship for a period of **37 months** from date of purchase. OMEGA Warranty adds an additional one (1) month grace period to the normal **three (3) year product warranty** to cover handling and shipping time. This ensures that OMEGA's customers receive maximum coverage on each product.

If the unit malfunctions, it must be returned to the factory for evaluation. OMEGA's Customer Service Department will issue an Authorized Return (AR) number immediately upon phone or written request. Upon examination by OMEGA, if the unit is found to be defective, it will be repaired or replaced at no charge. OMEGA's WARRANTY does not apply to defects resulting from any action of the purchaser, including but not limited to mishandling, improper interfacing, operation outside of design limits, improper repair, or unauthorized modification. This WARRANTY is VOID if the unit shows evidence of having been tampered with or shows evidence of having been damaged as a result of excessive corrosion; or current, heat, moisture or vibration; improper specification; misapplication; misuse or other operating conditions outside of OMEGA's control. Components which wear are not warranted, including but not limited to contact points, fuses, and triacs.

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RETURN REQUESTS / INQUIRIES

Direct all warranty and repair requests/inquiries to the OMEGA Customer Service Department. BEFORE RETURNING ANY PRODUCT(S) TO OMEGA, PURCHASER MUST OBTAIN AN AUTHORIZED RETURN (AR) NUMBER FROM OMEGA'S CUSTOMER SERVICE DEPARTMENT (IN ORDER TO AVOID PROCESSING DELAYS). The assigned AR number should then be marked on the outside of the return package and on any correspondence.

The purchaser is responsible for shipping charges, freight, insurance and proper packaging to prevent breakage in transit.

FOR **WARRANTY** RETURNS, please have the following information available BEFORE contacting OMEGA:

1. Purchase Order number under which the product was PURCHASED,
2. Model and serial number of the product under warranty, and
3. Repair instructions and/or specific problems relative to the product.

FOR **NON-WARRANTY** REPAIRS, consult OMEGA for current repair charges. Have the following information available BEFORE contacting OMEGA:

1. Purchase Order number to cover the COST of the repair,
2. Model and serial number of the product, and
3. Repair instructions and/or specific problems relative to the product.

OMEGA's policy is to make running changes, not model changes, whenever an improvement is possible. This affords our customers the latest in technology and engineering.

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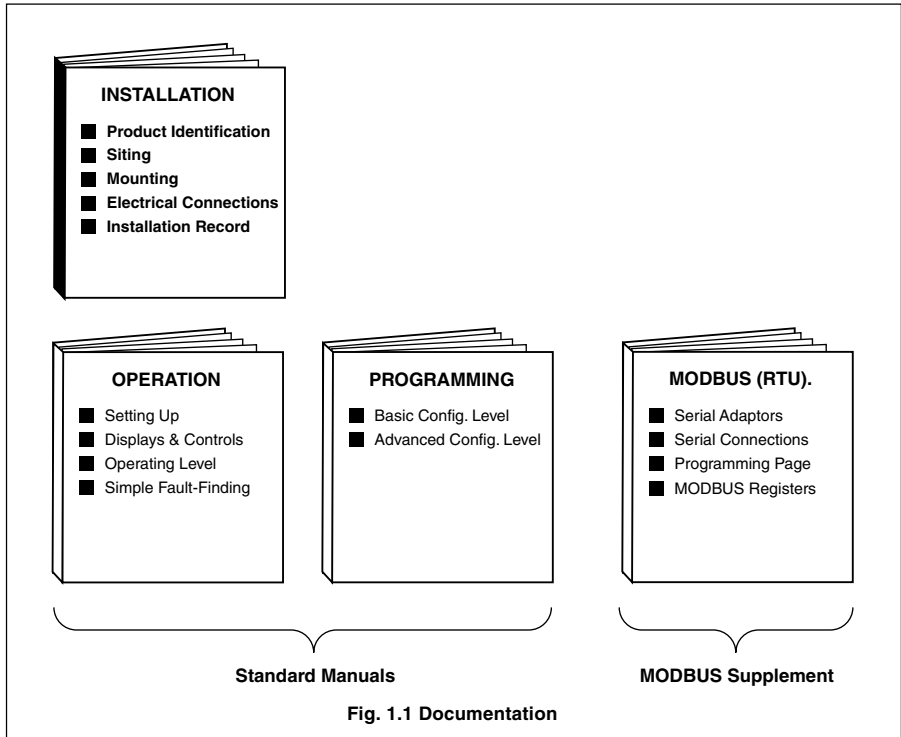
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1 INTRODUCTION

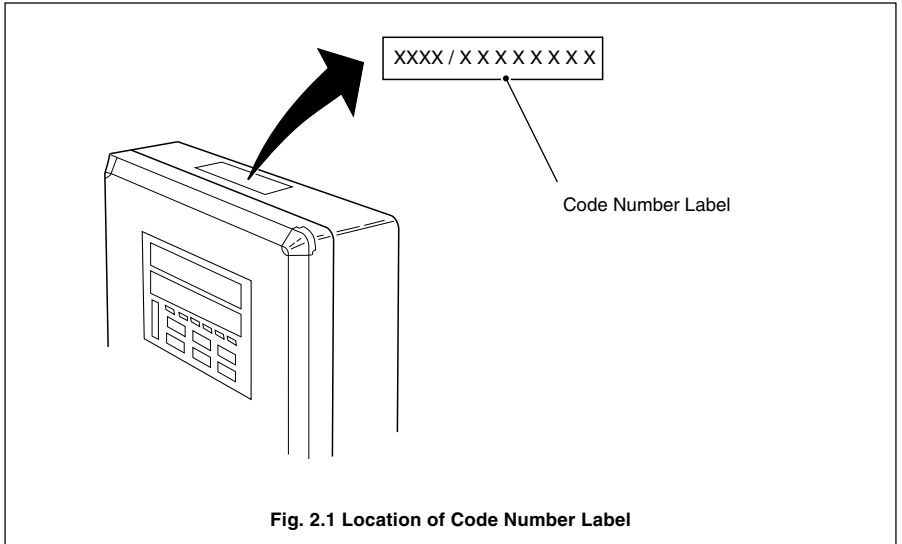
The instrument documentation is shown in Fig. 1.1. The **Standard Manuals**, including the specification sheet, are supplied with all instruments. The **Modbus Supplement** is supplied with instruments configured for Modbus Serial Communication.

This manual includes an **Installation Record** which should be completed as a log of the electrical installation. The record is useful when carrying out initial instrument programming and can be retained for future reference.



2 PREPARATION

2.1 Checking the Code Number – Fig. 2.1

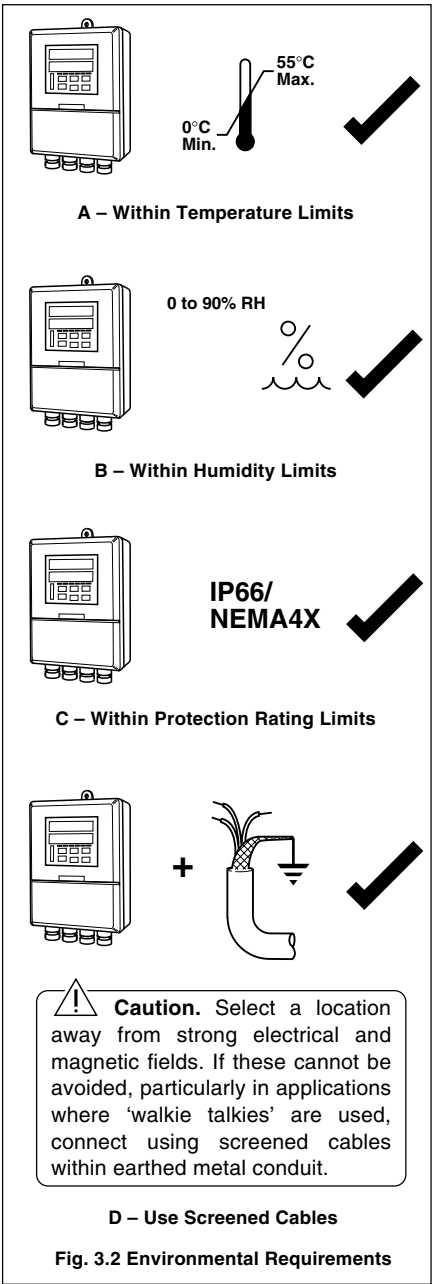
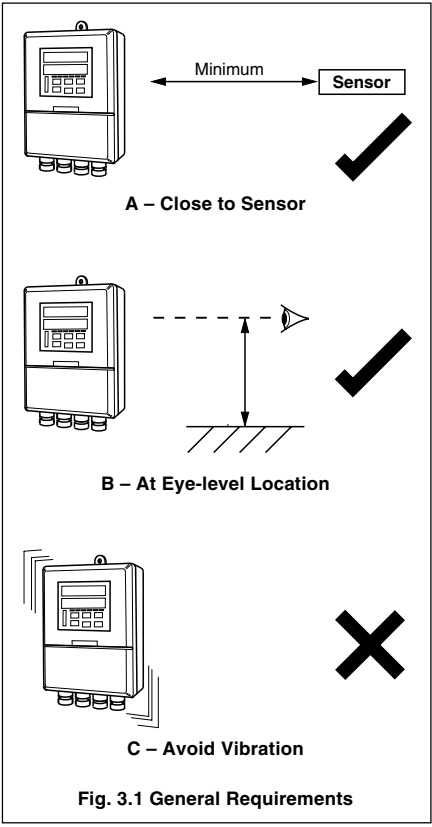


3 MECHANICAL INSTALLATION

EC Directive 89/336/EEC

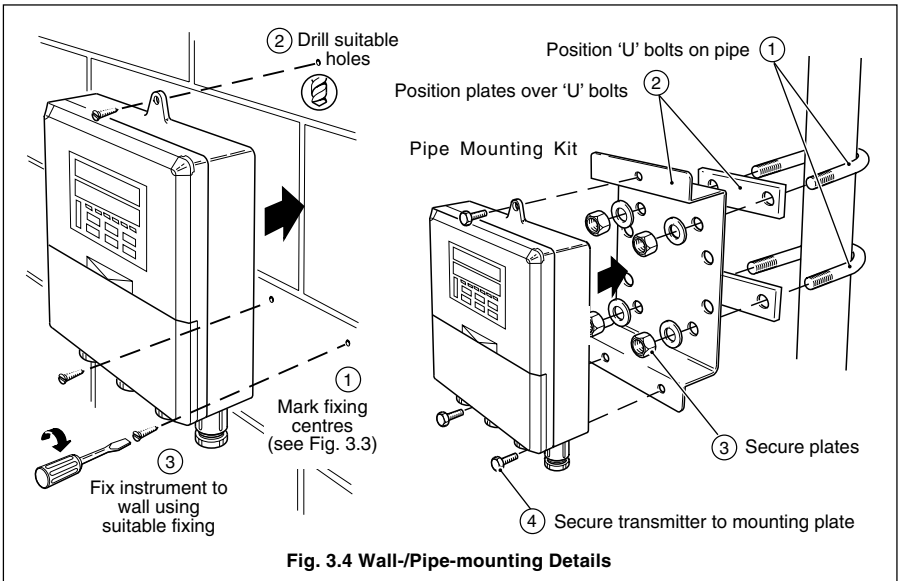
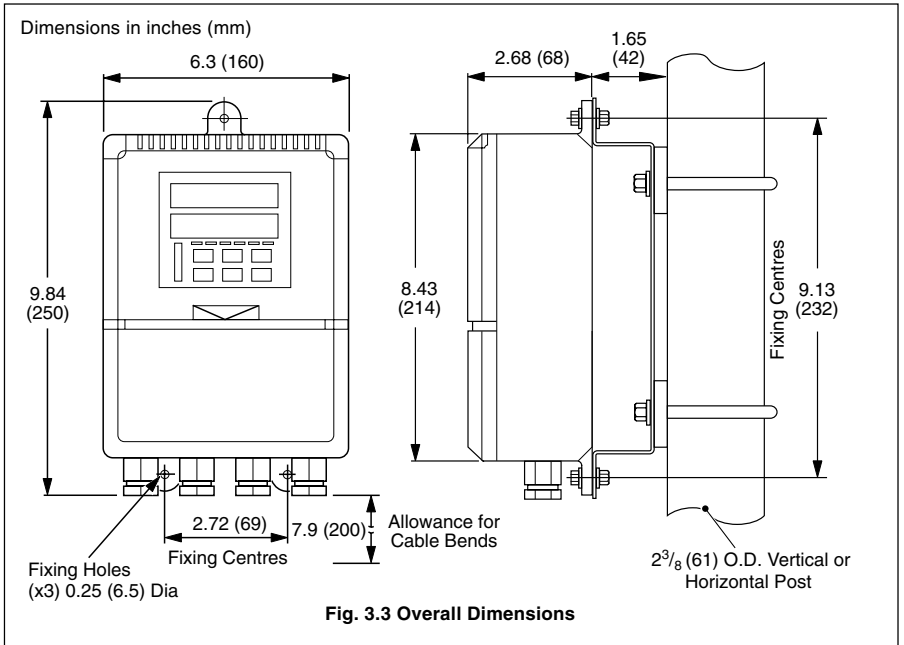
In order to meet the requirements of the EC Directive 89/336/EEC for EMC regulations, this product must not be used in a non-industrial environment.

3.1 Siting – Figs. 3.1 and 3.2



3.2 Mounting – Figs. 3.3 and 3.4

The instrument is designed for wall-/pipe-mounting – see Fig. 3.4. Overall dimensions are shown in Fig. 3.3.



4 ELECTRICAL INSTALLATION

Warning. Before making any connections, ensure that the power supply, any high voltage-operated control circuits and high common mode voltages are switched off.

Note.

- Always route signal leads and power cables separately, preferably in earthed metal conduit.
- It is strongly recommended that screened cable is used for signal inputs and relay connections. Connect the screen to the ground stud.

Information. Use cable appropriate for the load currents. The terminals accept cables up 12AWG (2.5mm²).

4.1 Access to Terminals – Fig. 4.1

For access to terminals – refer to Fig. 4.1, steps ① to ③.

4.2 Setting the Input Selector Links – Fig. 4.2A

Plug-in links on the microprocessor p.c.b. are positioned according to the type of Process Variable Input, Remote Set Point Input and Valve Position Feedback Inputs used.

Remove the instrument front panel – see Fig. 4.1, steps ① to ⑥.

Referring to Fig. 4.2A, set the link positions for the input type required.

4.3 Setting the Isolated Output Link – Fig. 4.2B

A plug-in link (PL7) on the microprocessor p.c.b. is positioned according to the isolated output required, either a current proportioning control output (programmable in range 0 to 20mA) or a 12V logic output (minimum load 400Ω). Referring to Fig. 4.2B – steps ① and ②, set the link for the output type required.

To use a 12V logic output, the control type must be set to Time Proportioning Control – see Fig. 3.1 of the *Programming Guide*.

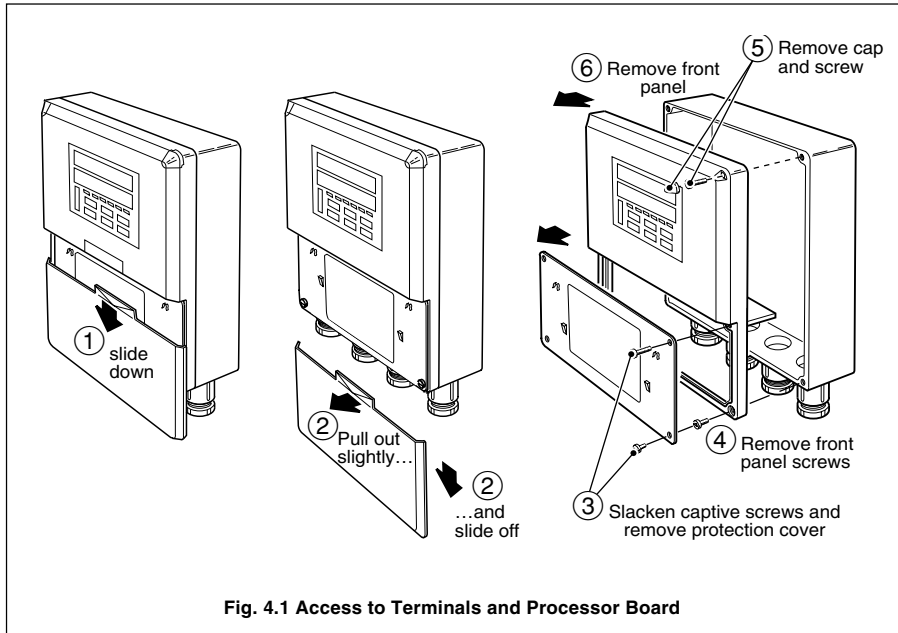
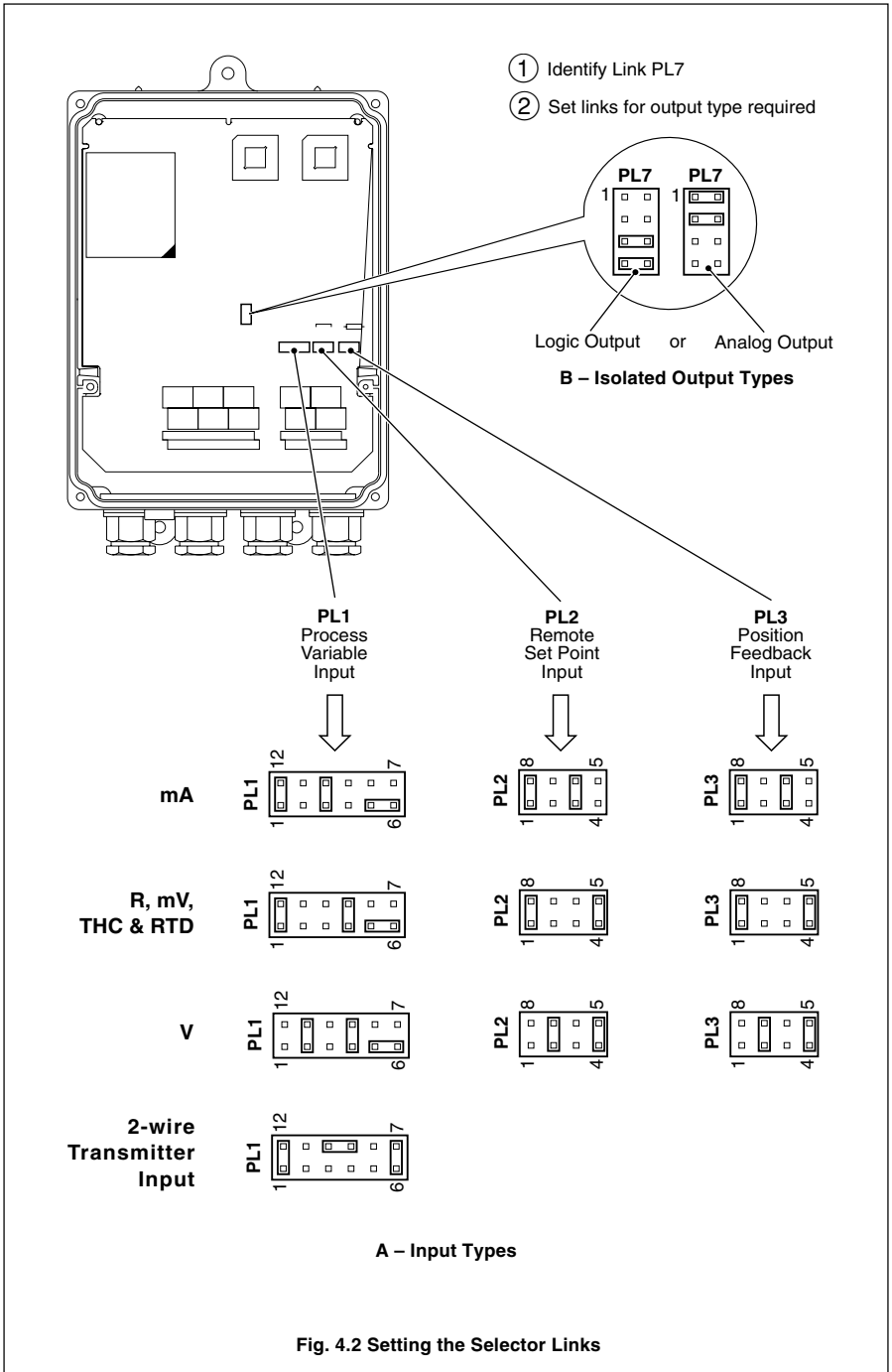


Fig. 4.1 Access to Terminals and Processor Board



4.4 Cable and Conduit Fixings

Glands

4.4.2 Conduit (N. American – 0.5in) – Fig. 4.4

Adaptors

4.4.1 Cable (IEC – 20mm) – Fig. 4.3

Glands

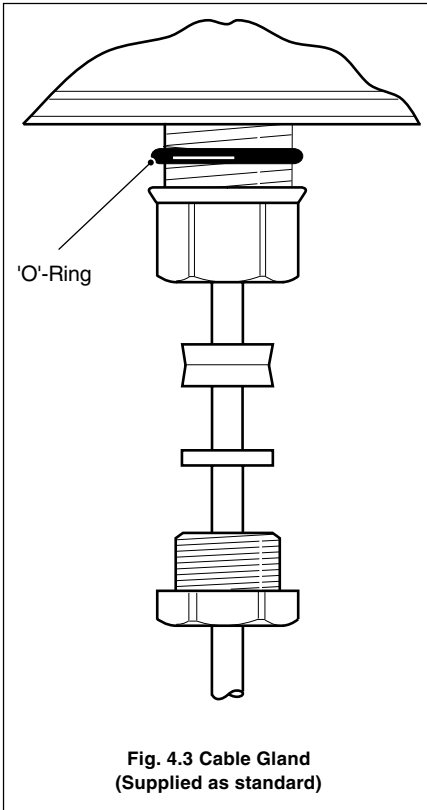


Fig. 4.3 Cable Gland (Supplied as standard)



Warning.

- Rigid conduit must NOT be fitted to the controller.
- Controller adaptors must incorporate a face seal.
- Torque settings for the hubs and outer nuts on the specified adaptors is 20ft. lbs minimum, 25ft. lbs. maximum.



Information.

- Suitable adaptors for controller (mandatory for FM installations):
APPLETON
ST-50 PLUS STG-50 or STB-50 PLUS STG-50.
Reusable ONLY with replacement ferrule STF-50.
O.Z. GEDNEY
4Q-50, 4Q50T or 4Q-50TG.

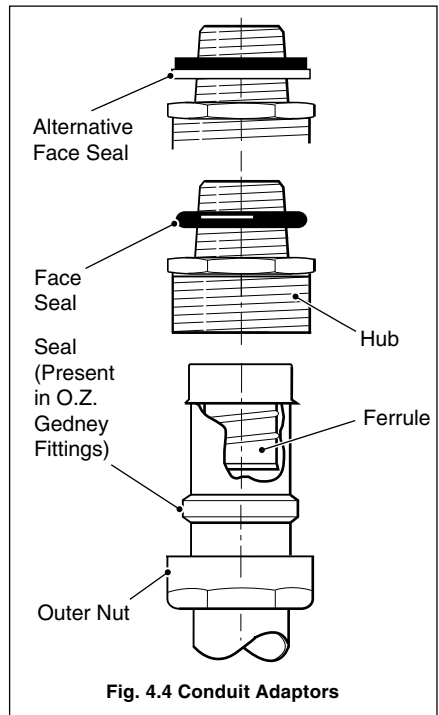


Fig. 4.4 Conduit Adaptors

4.4.3 Cable Glands (N. American – 0.5in) – Fig. 4.5



Warning.

- Controller glands must be fitted with a face seal.
- Torque settings (hubs only) – 20ft. lbs minimum, 25ft. lbs. maximum.
- Outer nuts – hand tight plus a half turn only.



Information.

- Suitable Cable Glands: (mandatory for FM installations):
O.Z. GEDNEY
SR-50-375 or SR-504
APPLETON
CG 3150 or CG-3150S (and STG-50 sealing ring).
THOMAS & BETTS
2521.
- When fitting cable glands to the controller, start with an outer gland and also temporarily fit a gland at the opposite end, to aid location of the transmitter gland plate. Fit and tighten glands consecutively from initial gland.

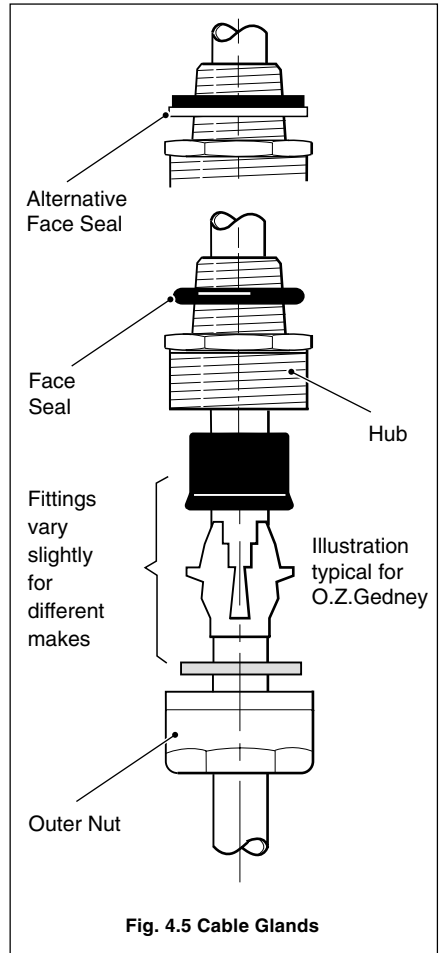


Fig. 4.5 Cable Glands

4.5 Connections Summary – Fig. 4.6

i **Information.**

Input impedances:
Low voltage(mV) >10MΩ
Voltage >10MΩ
Current 10Ω.

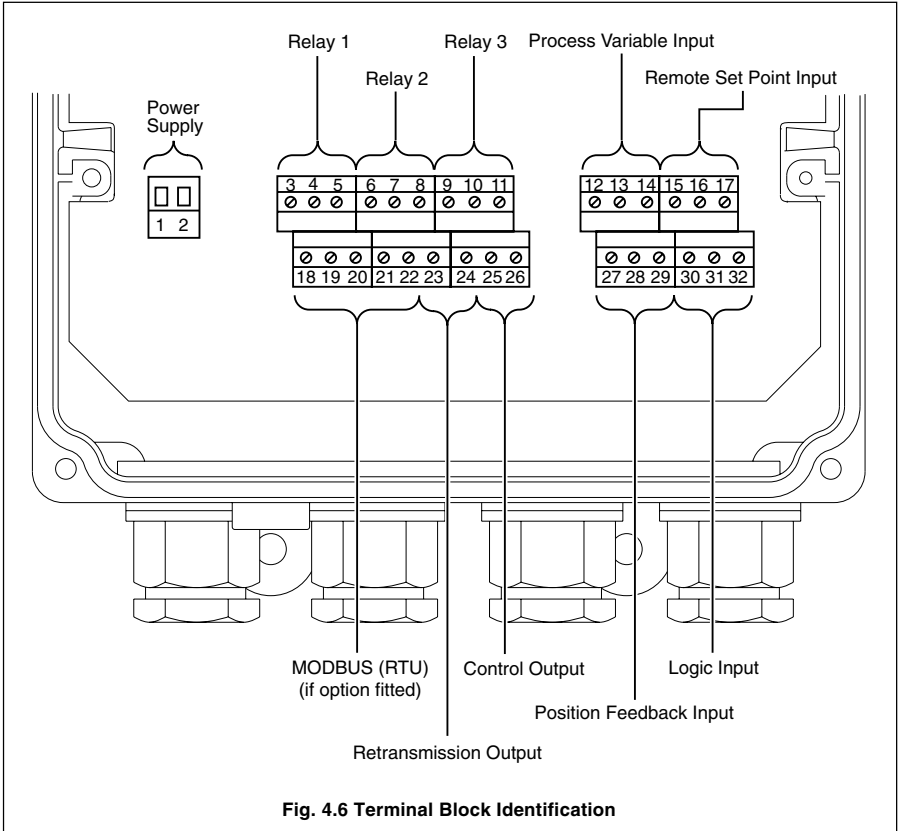


Fig. 4.6 Terminal Block Identification

Terminal Number				
AC Supply				
1	L	24V, 115V or 230V a.c.	}	– see Fig. 4.22
2	N			
3	N/O	} Relay 1 Output – see Fig. 4.17	}	Motorized Valve Control Relay (open) – see Fig. 4.19A
4	C			
5	N/C			
6	N/O	} Relay 2 Output – see Fig. 4.17	}	Motorized Valve Control Relay (close) – see Fig. 4.19A
7	C			
8	N/C			
9	N/O	} Relay 3 Output – see Fig. 4.17	}	Alarm Relays
10	C			
11	N/C			
12	3rd lead/2-wire TX	} Process Variable Input or 2-wire Tx Power Supply – see Figs. 4.7 to 4.9, 4.12 and 4.14	}	– see Fig. 4.13
13	Input 1+			
14	Input 1–			
15	3rd lead	} Remote Set Point Input – see Figs. 4.7 to 4.12 and 4.14	}	
16	Input 2+			
17	Input 2–			
18	Tx+	} RS 485 Modbus Serial Communications Option 1 only – see <i>Modbus (RTU) Communications Supplement</i>	}	
19	Tx–			
20	Common			
21	Rx+			
22	Rx–			
23	+	} Retransmission Output/Cool Output – see Fig. 4.15	}	
24	–			
25	+	} Current Proportioning Control Output/Heat Output Fig. 4.15 or 12V Logic Control Output Fig. 4.16	}	
26	–			
27	3rd lead	} Position Feedback Input – see Figs. 4.18 , 4.19A and 4.19B	}	
28	Input 3+			
29	Input 3–			
30	}	Logic Input 1 – see Figs. 4.20 and 4.21	}	
31		Logic Input 2 – see Figs. 4.20 and 4.21		
32		Common		

Table 4.1 Electrical Connections

4.6 Input Connections

Make connections to each input, as shown in Figs 4.4 to 4.14, first removing any factory-fitted wire links not required.

4.6.1 Thermocouple (THC) Inputs – Fig. 4.7

* **Note.** Automatic Cold Junction Compensation (ACJC) is active when an input is programmed for use with thermocouples. Use the correct compensating cable between the THC and the terminals – see Table 4.2.
 If an external fixed cold junction is used, the connections to the instrument must be made with copper cable. The input must be programmed for mV input signals and the appropriate THC linearizer selected – see Sections 4.5 and 4.6 of the *Programming Guide*.

Type of Thermocouple	Compensating Cable			
	BS1843	ANSI MC 96.1	DIN 43714	BS4937 Part No.30
Ni-Cr/Ni-Al (K)	+ Brown – Blue Case Red	+ Yellow – Red Case Yellow	+ Red – Green Case Green	+ Green – White Case Green *
Nicrsil/Nisil (N)	+ Orange – Blue Case Orange	+ Orange – Red Case Orange	—	+ Pink – White Case Pink *
Pt/Pt-Rh (R and S)	+ White – Blue Case Green	+ Black – Red Case Green	+ Red – White Case White	+ Orange – White Case Orange *
Cu/Cu-Ni (T)	+ White – Blue Case Blue	+ Blue – Red Case Blue	+ Red – Brown Case Brown	+ Brown – White Case Brown *
Fe/Con (J)	+ Yellow – Blue Case Black	+ White – Red Case Black	+ Red – Blue Case Blue	+ Black – White Case Black *
* Case Blue for intrinsically safe circuits				
Fe/Con (DIN 43710)	—	—	DIN 43710 + Blue/red – Blue Case Blue	—

Table 4.2 Thermocouple Compensating Cables

4.6.2 3-lead Resistance Thermometer (RTD) Inputs – Fig. 4.8

The three leads must have equal resistance, not exceeding 50Ω each.

4.6.3 2-lead Resistance Thermometer (RTD) Inputs – Fig. 4.9

If long leads are necessary it is preferable to use a 3-lead RTD. If the RTD is to be used in a hazardous area a 3-lead RTD must be used.

4.6.4 Links for Unused Inputs

To reduce susceptibility to electro-magnetic interference, ensure that the three terminals on each unused input are shorted together with sleeved wire links.

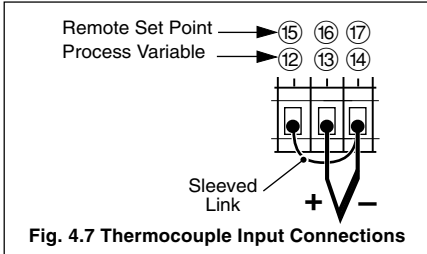


Fig. 4.7 Thermocouple Input Connections

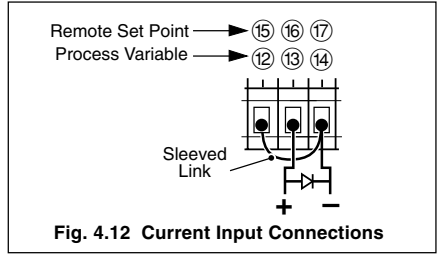


Fig. 4.12 Current Input Connections

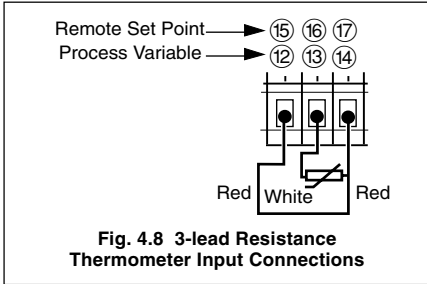


Fig. 4.8 3-lead Resistance Thermometer Input Connections

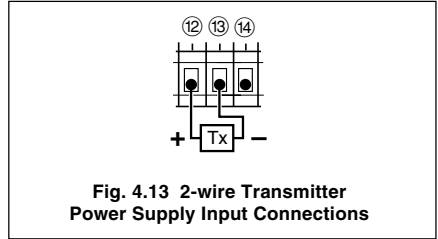


Fig. 4.13 2-wire Transmitter Power Supply Input Connections

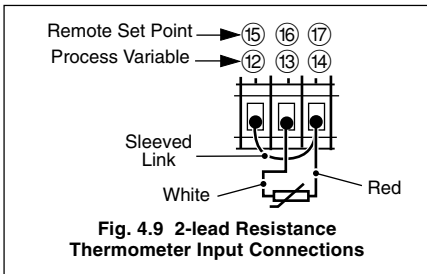


Fig. 4.9 2-lead Resistance Thermometer Input Connections

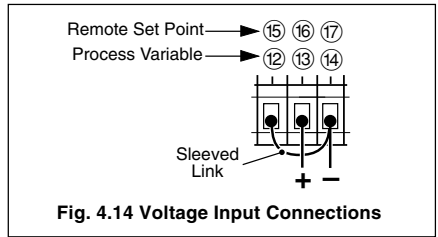


Fig. 4.14 Voltage Input Connections

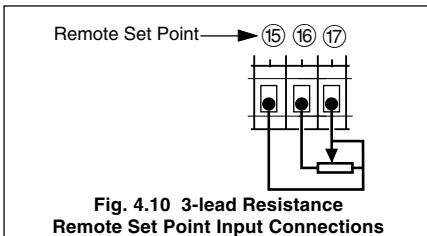


Fig. 4.10 3-lead Resistance Remote Set Point Input Connections

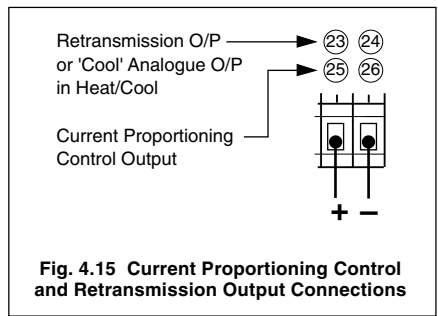


Fig. 4.15 Current Proportioning Control and Retransmission Output Connections

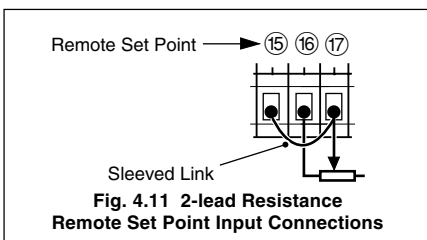


Fig. 4.11 2-lead Resistance Remote Set Point Input Connections

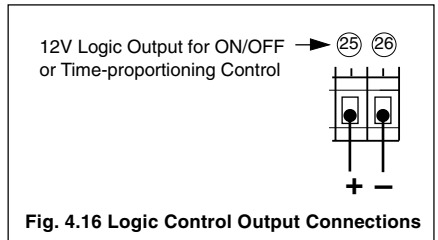


Fig. 4.16 Logic Control Output Connections

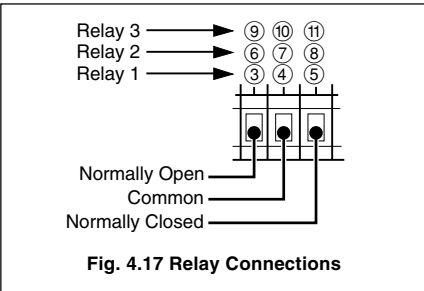
4.7 Output Connections

Make connections as shown in Figs 4.15 and 4.16.

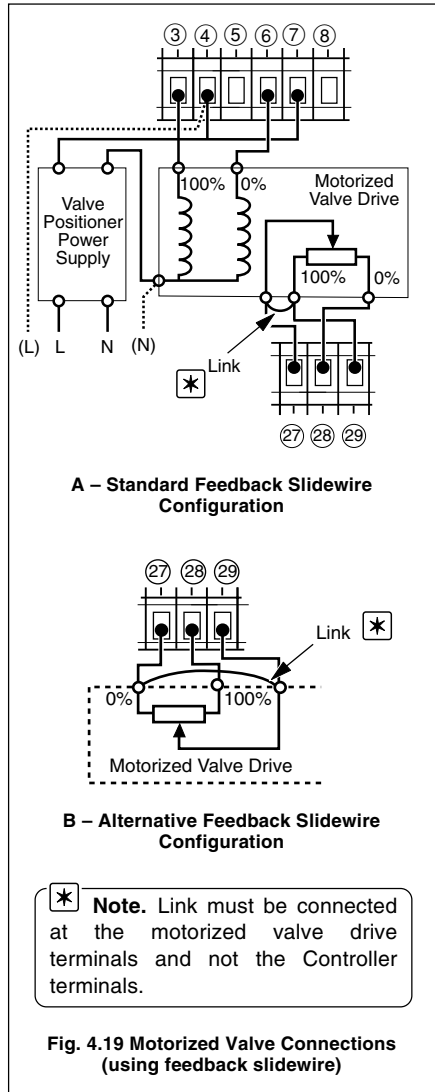
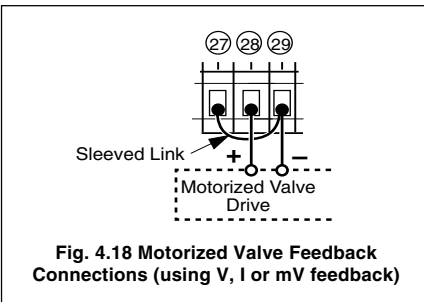
4.8 Relay Connections – Fig. 4.17

For relay functions refer to the following table.

	Relay 1	Relay 2	Relay 3
On/Off Control	✓	—	—
Time Prop.(Heat)	✓	—	—
Time Prop.(Cool)	—	✓	—
Motorized Valve	Open	Close	—
Alarm	✓	✓	✓

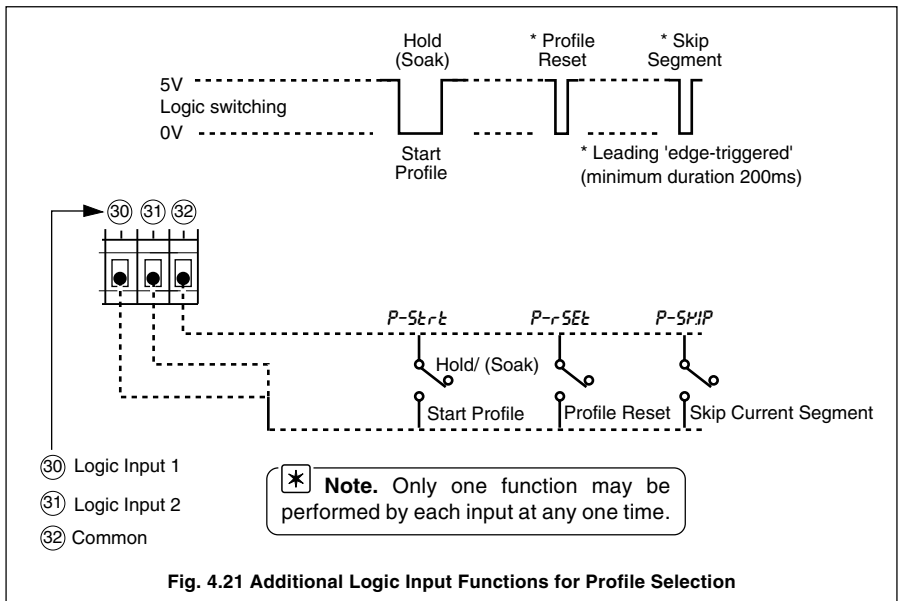
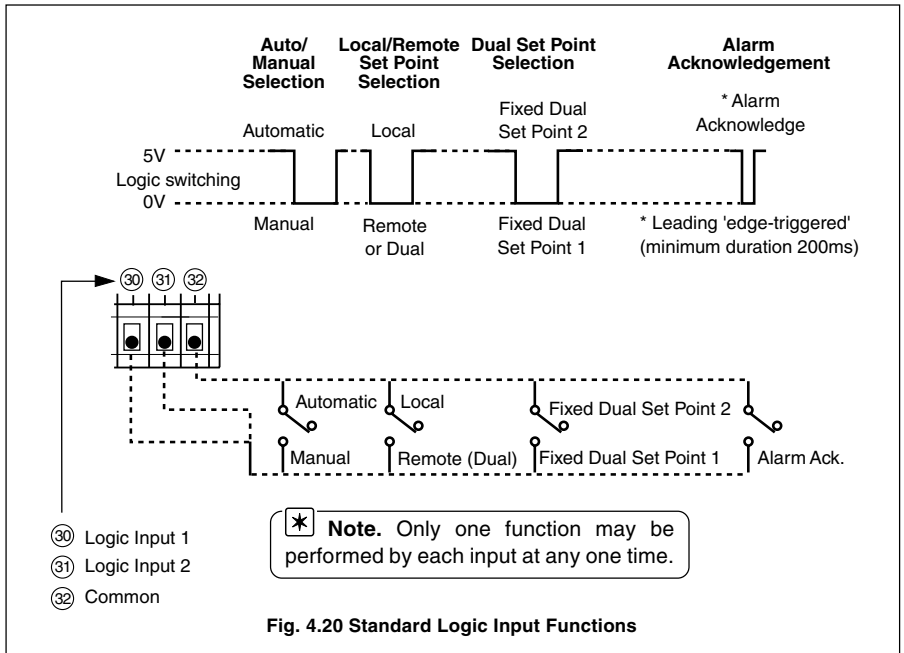


4.9 Motorized Valve Connections – Figs. 4.18 and 4.19



4.10 Logic Input Connections – Figs. 4.20 and 4.21

Each logic input can be programmed to perform one of a number of functions – see Section 3.10 of the *Programming Guide*.



4.11 Power Supply Selection and AC Connections – Fig. 4.22

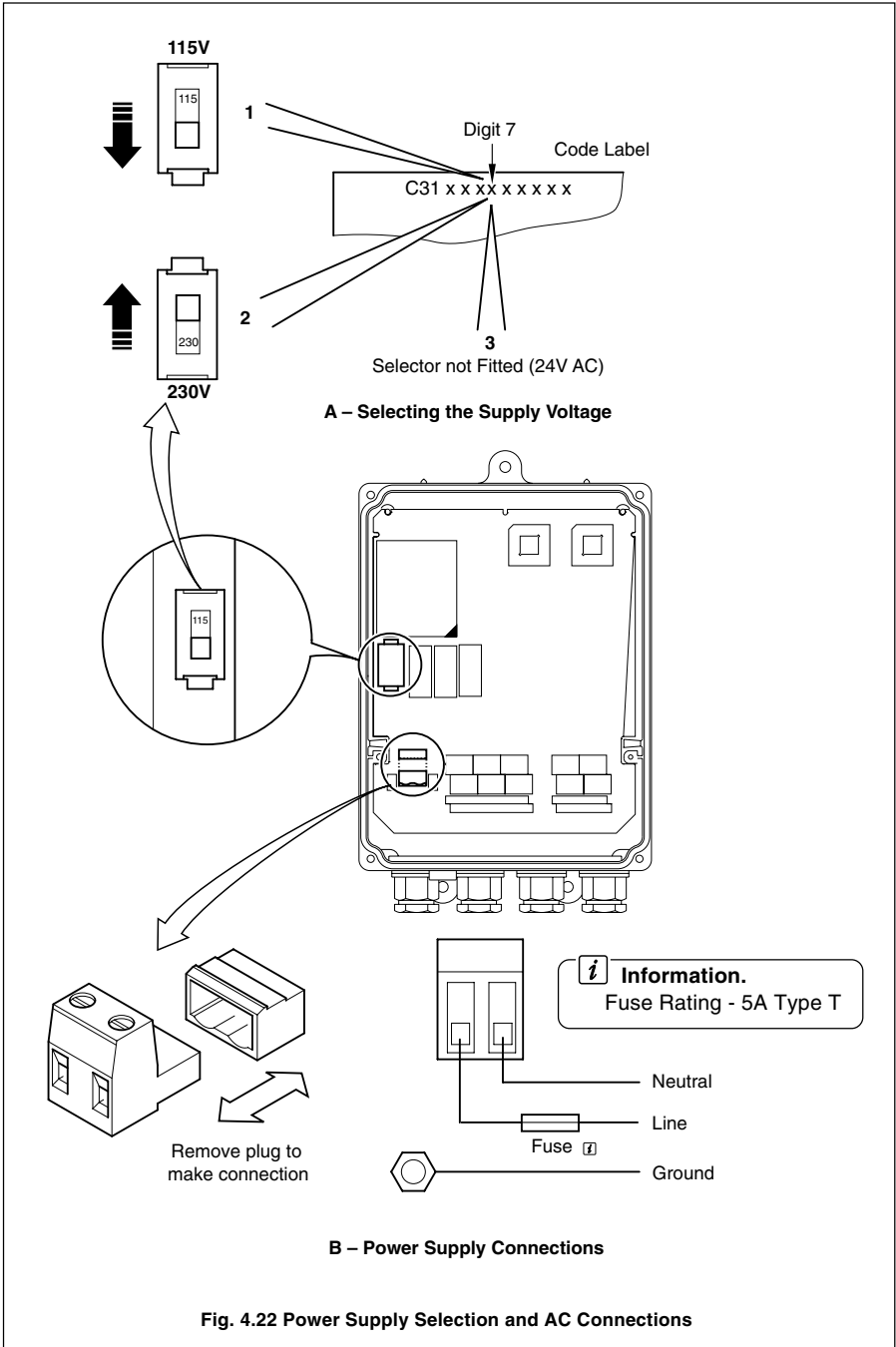
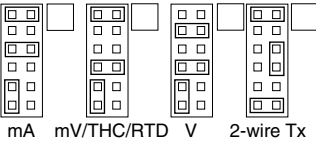
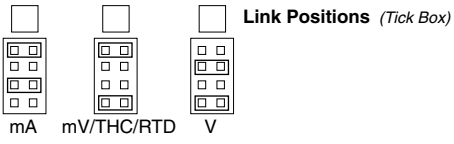
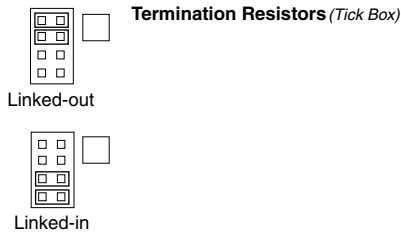
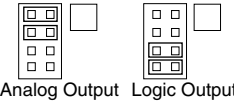
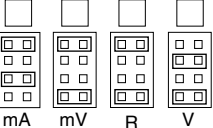


Fig. 4.22 Power Supply Selection and AC Connections

Connection/Terminal Number			
Power Supply	1	L	Power Supply (<i>Tick Box</i>) 230V AC <input type="checkbox"/> 24V AC <input type="checkbox"/> 115V AC <input type="checkbox"/>
	2	N	
Relay 1 Output	3	NO	Output Type: Output Function:
	4	C	
	5	NC	
Relay 2 Output	6	NO	Output Type: Output Function:
	7	C	
	8	NC	
Relay 3 Output	9	NO	Output Type: Output Function:
	10	C	
	11	NC	
Process Variable Input	12	3rd	 Link Positions (<i>Tick Box</i>) mA mV/THC/RTD V 2-wire Tx
	13	+	
	14	-	
Remote Set Point Input	15	3rd	 Link Positions (<i>Tick Box</i>) mA mV/THC/RTD V
	16	+	
	17	-	
Modbus Serial Communications Option 1 only	18	Tx+	 Termination Resistors (<i>Tick Box</i>) Linked-out Linked-in
	19	Tx-	
	20	Common	
	21	Rx+	
	22	Rx-	
Retransmission Output	23	+	Output Type: Output Function:
	24	-	

...4 ELECTRICAL INSTALLATION

Connection/Terminal Number

Control Output	25	+		Link Positions <i>(Tick Box)</i>
	26	-		
Position Feedback Input	27	3rd		Link Positions <i>(Tick Box)</i>
	28	+		
	29	-		
Logic Input 1	30			
Logic Input 2	31			
Common	32			

NOTES



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Toll Free in Benelux: 0800 0993344
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Czech Republic: ul. Rude armady 1868, 733 01 Karvina-Hranice
Tel: 420 (69) 6311899 FAX: 420 (69) 6311114
Toll Free: 0800-1-66342 e-mail: czech@omega.com

France: 9, rue Denis Papin, 78190 Trappes
Tel: (33) 130-621-400 FAX: (33) 130-699-120
Toll Free in France: 0800-4-06342
e-mail: france@omega.com

Germany/Austria: Daimlerstrasse 26, D-75392 Deckenpfronn, Germany
Tel: 49 (07056) 3017 FAX: 49 (07056) 8540
Toll Free in Germany: 0130 11 21 66
e-mail: info@omega.de

United Kingdom: One Omega Drive, River Bend Technology Centre
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